

EFFECTS OF ADDITIONAL WORK PROGRAMME FOR KARATE PLAYERS IN PHYSICAL EDUCATION CURRICULA ON SOME MOTOR ABILITIES

(Original scientific paper)

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Abstract

The sample consisted of 52 subjects, pupils of primary schools in the region of Krusevac, male, aged 13 and 14 ± 6 months. The experimental group was composed of 26 subjects, covered with two classes per week of regular physical education curriculum classes and two classes for the implementation of the additional work program for karate players. The control group consisted of 26 subjects also covered by four PE classes a week just following regular physical education curriculum. The research was carried out with the aim to determine, on the basis of the comparison of the impact of the existing, ordinary physical education curriculum and the additional programmed work of karate in that teaching, on motor abilities: repetitive strength, flexibility and coordination in primary school pupils. Work in both groups in the experimental period was realized with 32 classes for a period of two months. Before the start of the teaching work and after its completion within two months for both groups a total of nine tests was applied, three for assessing repetitive strength, three for flexibility and three for coordination. Results showed that within the experimental group subjects achieved better results in the studied areas and that there was a significant effect of the training program of work for karate players in the final test as well.

Keywords: *male pupils, physical education curriculum, additional programme of work, experimental & control group, motor tests, repetitive strength, motor flexibility, motor coordination, multivariate analysis of covariance*

INTRODUCTION

Educational and training processes require the application of scientific methodology to determine the structure of anthropological dimensions, their relationships, developmental characteristics and efficient procedures in the applied methods, organizational forms, appropriate intensity and volume of load and the choice of motor exercises as well. This approach of optimally programmed and homogenized teaching and training process, tailored to individual abilities and characteristics of children and youth, can be implemented.

The study of the transformation processes under the influence of motor exercising on the human body is one of the most important research subjects of sports science (Visnjić, 2006; Milanović, 2007; Stanković & Malacko, 2011).

Karate as a sport discipline comprises of polystructural acyclic movements focused on the symbolic destruction of the opponent. Dynamics of movement and combat in karate is particularly emphasized in the actions of attack and defense, while static situations are almost nonexistent. They emerge only in maintaining

attitudes that karate players use for the concentration on the attacks and counter-attacks. Exercises for karate in terms of the structural and biomechanical specificity place high demands on the development of many anthropological characteristics of the karate players. Hypothetical success specification equation in karate is very complex. It was found that the order of contribution dimensions of motor abilities are: speed, coordination, strength, flexibility, precision and balance (Cirković, & Jovanović, 1992).

To successfully analyze the effects of training it is important to satisfactorily resolve the issues of programming and control of the training process and the choice of the methodological procedures that are appropriate to the problem being analyzed.

The main objective of the research was to compare the impact of the regular physical education classes and an additional programmed work for karate players in that teaching on motor abilities, repetitive strength, flexibility and coordination in primary school pupils, aged 13 to 14.

METHODS

The population from which the sample of 52 subjects was taken, was made up of primary schools pupils in the region of Krusevac, male, aged 13 and 14 ± 6 months.

From such a defined sample two subsamples were formed. The first subsample consisted of 26 subjects attending two classes a week of regular PE curriculum classes and two more classes for the implementation of the additional work program for karate players. The second subsample was also composed of 26 pupils. Subjects attended four classes a week just following the regular physical education curriculum classes. The first subsample represented the experimental group and the second the control group. Research work in both groups lasted for two months, and during that period both groups realized each 32 classes in the experimental period.

Before the start of the teaching work and after its completion after two months, in both groups the tests for assessing the repetitive strength, flexibility and coordination were applied.

To estimate the repetitive strength following tests were applied: trunk lifting on the Swedish bench (MDTK), mixed pull-ups (MMZG) and squats (MČUČ). To assess flexibility following tests were applied: a deep forward bend on bench (MDPK), straddle split (MŠPA) and shoulder test standing with a bat (SMEs); for the

evaluation of coordination following tests were applied: agility in the air (MOKV), coordination with the bat (MKOP) and agility on the floor (MOTL). The tests were selected based on the instructions and recommendations of Kurelić et al., (1975).

The data obtained from the applied tests at the beginning and at the end of the experimental period were analyzed by the method of multivariate analysis of covariance.

Work in the experimental group involved in the additional program for karate players was based on the use of motor exercises for developing of coordination skills so that movements could be applied effectively, in a technically perfect manner and very fast. Primarily, it was agility (the ability to quickly change direction and mode of movement), the speed of performing complex motor tasks, the ability to quickly perform complex movements of arms and legs, speed of learning new motor tasks and the coordination of the whole body. These abilities enable rapid movement, quick change of positions and guards, changing the direction of movement, performance of the combined structure of movements, strikes and blocks, simultaneous moving and striking or blocking strikes, and all of these make successful mastering of karate techniques.

Investigation of the efficiency of the regular physical education teaching in the control group was realized

Table 1. Multivariate analysis of variance between the corrected arithmetic means of the experimental and control groups in motor abilities

Wilks' Lambda	Rao's R	Q
.198	10.19	.000

Legend: Values of Bartlett's test (Wilks' Lambda), Rao's R-approximation (R Rao's) and the level of significance (Q)

Table 2. The significance of differences between the corrected arithmetic means of the motor variables of the experimental and control groups of pupils using analysis of covariance

Motor tests	Groups	Mean	F-relation	Q
MDTK	EK	19.30	6.84	.000
	KO	16.60		
MMZG	EK	15.40	5.20	.000
	KO	13.90		
MČUČ	EK	22.80	7.12	.000
	KO	16.10		
MDPK	EK	40.30	5.86	.000
	KO	32.20		
MŠPA	EK	149.50	3.67	.031
	KO	145.60		
MISP	EK	74.20	6.62	.000
	KO	83.50		
MOKV	EK	12.40	5.88	.000
	KO	15.80		
MKOP	EK	11.00	5.71	.000
	KO	15.60		
MOTL	EK	29.40	2.92	.071
	KO	33.20		

Legend: arithmetic mean of the experimental group (Mean (EK)), arithmetic mean of the control group (Mean (KO)), value of F-test (F-ratio) and the level of significance (Q)

on the basis of the implementation of the existing PE curriculum proposed by the Ministry of Education of the Republic of Serbia for a defined age of the pupils in this study. The structure of teaching programs in this group had largely a transformational character for the development of the anthropological characteristics and the increase of the level of technical and the tactical knowledge.

RESULTS

Table 1. shows the results of the multivariate analysis of variance between the experimental and control groups, indicating that there was a statistically significant intergroup difference in motor abilities, having in mind that Wilk's lambda is .198, which by Rao's F-approximation of 10:19 gives significance of differences at the level of $Q = .000$. Accordingly, in the applied system of motor abilities of the subjects a statistically significant differences were determined.

Table 2. shows the univariate analysis of variance of the motor abilities tests by comparing the results of the arithmetic means of the experimental and control groups in the final measurement. The coefficient of F-relations and their significance (Q) allow to state that in seven motor tests a statistically significant difference at the level of .01. was determined. In one test (MŠPA) the difference was statistically significant at the level of .05. Only in the test of coordination (MOTL) was the difference not statistically significant

DISCUSSION AND CONCLUSION

The applied additional work program for karate players in the additional teaching of physical education has contributed to the positive transformation of the tested motor abilities in the experimental group of subjects.

It can be concluded that this program for karate players has induced significantly better results in the experimental group compared to the control group in all the tests, except in one with coordination (agility on the floor - MOTL). The experimental group in the dimension of the repetitive strength (trunk lifting on the Swedish bench (MDTK), mixed pull-ups (MMZG) and squats (MČUČ) has achieved statistically significant better results in all three tests than the control group. Similar to the repetitive strength in dimension of flexibility too significantly better results in the experimental group in all three tests (deep forward bend on bench MDPK) straddle split (MSPA) and shoulder test standing with a bat (MISP) have been achieved. Only in the dimension of coordination out of the three applied tests have significantly better results in two tests (agility in the air (MOKV) and coordination with the bat (MKOP) been achieved.

The results of this study indicate that the experimental group subjects differ quantitatively in motor abilities and that an additional program of work for karate players has induced positive changes in the tested motor abilities and the occurred differences in favor of the

experimental group.

Physical education curricula in primary schools according to some researchers (Babin, 1985, Visnjić, 2006; Denmark, and Galić 2002, Malacko and Doder, 2008) usually lacks enough effective exercises to develop skills and qualities that are a basic requirement of the quantitative and qualitative dimensions of the anthropological status of pupils. The PE curriculum is usually planned according to the needs of the average pupils, thus negating the basic biological principles, claiming that pupils differ, both in physical and intellectual potentials. Such an approach to PE teaching has a number of undesirable manifestations in terms of the pupils involvement and progress, because for some pupils teaching contents are too easy and for the others too difficult.

Additional work program for karate players in our research was absolutely appropriate to the anthropological status of the subjects. This was certainly facilitated by the proper implementation of organizational forms of work and methods for the realization of more complex structures of motor exercises. Special attention was paid to correct body posture (arms position, hips direction, knees and feet) and developing a sense and awareness of the position of the gravity center of the body.

In addition, the scope and intensity of the load was in keeping with the age characteristics and functional - motor status of the pupils. Load dosage had a gradual and progressive character in the intensity of the load to increase the activity of the central and peripheral nervous system. This was necessary to achieve transmission speed of the nerve impulses to activate the greatest number of motor units and start up of cardio-respiratory system so as to ensure the oxygen transport and aerobic energy process. Justification of the obtained results was confirmed by numerous studies (Sorensen, Zacho, Simonsen, Dyhre-Poulsen & Klausen, 1996; Zehr & Dowling, 1997; Mori, Ohtani, & Imanaka, 2002; Sertić 2004; Milanović, 2014).

Using such an approach with the additional teaching in the experimental group it was achieved for all the mentioned body parameters to be successfully implemented and result in more efficient performance of the karate players' motor tasks.

The results obtained in this study generally point to a need to innovate classes of physical education teaching and introduce some additional work program with exercises which allow for greater intensity of movement body activities so as to improve motor abilities. By all means such programs should be based on the results of some further research, the subject of which would be in line with the subject of this study.

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